



**SITE NARRATIVE**  
**Nu-Quality Ice Cream**  
**Town of Southern Shores**  
**Dare County, North Carolina**

Prepared for:  
Spiros Giannakopoulos  
5415 OBX, LLC  
800 N. Hughes Boulevard  
Elizabeth City, NC 27909

Prepared by:  
Quible & Associates, P.C.  
PO Drawer 870  
Kitty Hawk, NC 27949

March 16, 2018  
P15167.1



## **Table of Contents**

Overview .....	2
Access.....	2
Parking .....	2
Stormwater Management Plan.....	2
Treatment.....	3
Storage .....	3
Disposal .....	3
Soils .....	4
Utilities.....	4
Buffers and Site Vegetation .....	4

## **Appendices**

*Appendix A - On-site Soils Report*

*Appendix B - Stormwater Calculations*

## **Overview**

The subject property is located at 5415 N. Croatan Highway, Town of Southern Shores, NC approximately 2,135 feet west of Ocean Boulevard (N.C. 12) and Caratoke Highway (U.S. 158) intersection. The property is located along the north side of Caratoke Highway in Dare County. The site development proposes the construction of a 910 sq. ft. Ice Cream Shop. The project development will include the associated parking, drainage, water, and septic improvements for the development of the 0.42 acre lot. The site is zoned Commercial (C) and a Conditional Use Permit for an Ice Cream Shop with a drive through will be required.

## **Access**

The proposed Building will be accessed from N. Croatan Highway (U.S. 158). The proposed access will provide a minimum 22' wide drive aisle at the front of the building. Side and rear access allow for a one-way 12' wide drive aisle that exits on the adjacent property. Private ingress/egress access agreements will be obtained from the adjacent property owner prior to construction.

A loading and unloading zone is required per The Town of Southern Shores, Section 36-163. (2) g. A 12 ft. by 25 ft. loading area has been provided and shown on the plan set. A reduced length loading berth is proposed due to the building size and use.

## **Parking**

The number of proposed parking spaces for the site development is 8. The proposed building has 12 seats and 4 employees. Parking requirements are calculated using 1 space per employee and 1 space per 3 seats. 4 parking spaces are required for employees and 4 spaces are required for patrons. A total of 8 spaces are required and 8 spaces have been provided (including 1 ADA accessible parking spaces).

Signage will be provided within the parking area to notify employees and visitors of the one-way drive aisle. Parking lot lighting is proposed and provided within the plan set.

## **Stormwater Management Plan**

Per 15A NCAC 02H.1005 (a) (3) (B) High Density Coastal Development is required to meet particular criteria. This development is proposed to have 25.5% of impervious coverage within the entire lot. This lot coverage calculation excludes all permeable pavements. There are two proposed infiltration basins onsite and they are designed in accordance with NCDEQ Requirements to store, control, and treat the stormwater runoff from all surfaces generated by the one and one-half inch of rainfall. Permeable pavements onsite have been sized to store a 1:1 BUA ratio to address off-site impervious coverage that is currently draining into the site. In addition to these requirements, a minimum 50' vegetative buffer from surface waters is provided.

## **Collection**

Runoff from the proposed vehicular area is to be collected and conveyed to the infiltration basins via sheet flow and vegetated swales. Runoff draining from the proposed building will be collected by roof drains and will discharge into the rear infiltration basin.

### Treatment

The proposed infiltration system will offer several methods of treatment prior to release.

Runoff from vehicular areas will be directed to the infiltration basin via vegetated swales. The vegetated swales will provide the first level treatment for these areas and will provide filtration of small particulates and nutrients prior to entering the infiltration basin.

The primary treatment of runoff will be provided within the infiltration basins. The infiltration basin bottom and side slopes will be grassed according to general seeding specifications. The runoff will undergo filtration of fine particulates and pollutants by the vegetation within the basin. The filtration by vegetation is considered the primary method of treatment. A secondary method of treatment is also available when the stormwater runoff infiltrates into the subsurface. The soil particles between the basin bottom and the season high water table (SHWT) will offer additional filtration and/or absorption of particulates and pollutants prior to reaching the water table. The season high water table (SWHT) is at an elevation of 4.7'. Separation of greater than 2' between the seasonal high water table and the bottom of the basin has been provided per NCDEQ minimum design criteria 2.

### Storage

Permeable pavements have been designed to store a 1:1 BUA ratio within the site per NCDEQ minimum design criteria 7. All built upon area draining to these pavements is existing and from off-site development and include impervious surfaces. All pervious off-site runoff has been prevented from reaching the permeable pavement to the greatest extent possible. A void space of 40% within the porous gravel base will be required for all permeable pavements. The thickness of the storage area with the proposed permeable pavements has been provided at a minimum of 8" thick per calculations as required by NCDEQ minimum design criteria 5.

Two infiltration basins are proposed at the site. The front infiltration basin has been designed with a top elevation of 9.5' and bottom of 8.0'. This infiltration basin provides approximately 1.5 inches of stormwater storage and treats predominately off-site impervious coverage. The rear infiltration basin is designed with a top elevation of 9.7' and a bottom of 8.0'. This infiltration basin provides approximately 2.74 inches of storage. Detailed calculations are provided within **Appendix B**.

### Disposal

The infiltration basin's primary mode of disposal is through infiltration. Per an onsite soils information (provided in **Appendix A**), infiltration rates appear to be approximately 5.95 inches per hour for the anticipated soils at the site. This infiltration rate will allow the front basin to drawdown within 3.03 hours and the rear basin will draw down within 3.43 hours. Supporting calculations for this drawdown time have been provided within **Appendix C**.

Calculations for the proposed infiltration basins have been provided in **Appendix B**. The rear infiltration basin design allows for storage up to elevation 9.7' and the front infiltration basin design allows for storage up to elevation 9.5'. The basin would overflow into the adjacent stormwater network starting at elevation 9.5'. A summary of the storage available within the provided stormwater calculations.

## **Soils**

The USDA NRCS Soil Survey lists the soil in the vicinity of the stormwater detention basin as described below:

FrD – Fripp fine sand

This soil typically has 2 to 30 percent slope. Fripp fine sand typically has a very low runoff class and is excessively drained. This soil is categorized in Hydrologic Soil Group: A.

Quible and Associates conducted a soil boring test in the vicinity of the wet detention basin. The soils observed were consistent with the NRCS soil description and the seasonal high-water table is located at approximately 4.7'. The NRCS soil survey data is available in **Appendix A**.

## **Utilities**

The site has an existing water meter. This service connection will be reused with the proposed building. The existing water supply is provided by Dare County Water. The existing service size will be reviewed and confirmed during design of the building plans to determine if the existing meter is an adequate size. Changes to the existing waterline within the private right-of-way is not proposed, therefore, a permit to construct from NC DEQ Public Water Supply is not required. The proposed water service shall be installed per Dare County Water standard water specifications and details. Two existing fire hydrants are within 400' of the proposed site.

The proposed on-site wastewater is proposed to handle 480 gallons per day. This anticipated amount is in excess of the anticipated flows, 400 gallons per day. Wastewater calculations include 4 employees at 25 gpd/employee and 12 seats at 25 gpd/seat. An onsite evaluation is ongoing with Dare County Health Department to determine acceptable site characteristics.

## **Buffers and Site Vegetation**

Parking area plantings are required to cover 15% of the parking area. Currently a 5' wide perimeter of plantings at 10' on center is proposed adjacent to Croatan Highway and adjacent properties. These plantings account for 22.6% of the parking area, in excess of the 15% requirement. These plantings will be installed in accordance with Section 36-163 of the Town of Southern Shores Ordinance.

# Appendices

## **Appendix A - On-site Soils Map and Data**



United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for **Dare County, North Carolina**

**Nu-Quality Ice Cream**



March 15, 2018



alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

## MAP LEGEND

Area of Interest (AOI)		Area of Interest (AOI)	
Soils		Spot Area	
	Soil Map Unit Polygons		Stony Spot
	Soil Map Unit Lines		Very Stony Spot
	Soil Map Unit Points		Wet Spot
Special Point Features			Other
	Blowout		Special Line Features
	Borrow Pit	Water Features	
	Clay Spot	Streams and Canals	
	Closed Depression	Transportation	
	Gravel Pit		Rails
	Gravelly Spot		Interstate Highways
	Landfill		US Routes
	Lava Flow		Major Roads
	Marsh or swamp		Local Roads
	Mine or Quarry	Background	
	Miscellaneous Water		Aerial Photography
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dare County, North Carolina  
Survey Area Data: Version 17, Sep 26, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Feb 23, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Custom Soil Resource Report

**Hydric soil rating: Yes**

## Custom Soil Resource Report

**United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI.** [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

**United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.** [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

**United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.** [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

## **Appendix B - Stormwater Calculations**

## NCDEQ Stormwater Calculations

## Coverage Breakdown

	A(offsite)	A(onsite)	B(onsite)	B(offsite)	TOTALS
Concrete	30	295	163	0	488
Asphalt	6,689	0	1,407	0	8,096
Building	0	0	2,240	0	2,240
Perm. Patio	0	336	0	0	336
Perm. Conc.	0	890	2,547	0	3,437
Perm. Pavers	0	2,469	26	0	2,495
Total Imp.	6,719	295	3,810	0	10,824
Total Pervious	0	3,695	2,573	0	6,268
Totals	6,719	3,990	6,383	0	17,092
Total onsite 10,373 sf					

3,359 sf Permeable Conc. + Permeable Pavers (890 sf + 2,469 sf = 3,359 sf)

3,252 sf of offsite impervious asphalt to be conveyed and stored directly into permeable conc. &amp; pavers section

3,467 sf Adjusted offsite impervious (6,719 sf - 3,252 sf = 3,467 sf)

## Storage Calculations

	A (FRONT)		B (REAR)	
	(sq ft.)	(acre)	(sq ft.)	(acre)
Drainage Area =	15,675	0.36	14,746	0.34
Open Space	15,380	0.35	10,831	0.25
Pond =	0	0.00	0	0.00
Onsite Impervious =	295	0.01	3,915	0.09
Offsite Impervious =	3,467	0.08	0	0.00
Total Impervious =	3,762	0.09	3,915	0.09

## Runoff generated by Rainfall Event (NCDEQ Simplified Method)

Ia = Impervious Percentage = Impervious Area/Drainage Area

Rv = Runoff Coefficient, 0.05+0.9Ia

Rd = Rain fall depth

V = Runoff Volume, 3630\*Rd\*Rv\*A

	A (on-site only)	A (on-site + off-site)	B
Ia =	1.9%	24.0%	26.6%
Rv =	0.07	0.27	0.29
Rd (in.) =	1.5	1.5	1.5
A (ac.) =	0.36	0.36	0.34
V (cf.) =	131	521	533

Total Storage Required by NCDEQ = 664 cf (excluding offsite)

Total Storage Provided = 1512 cf (see below)

## Infiltration Basin Stormwater Calculations for NCDEQ

## Above Grade Storage Provided In Infiltration Basins

A (FRONT) - Above Grade Storage				
Elev	Area (sf)	Avg area (sf)	Volume (cf)	Cum Vol. (cf)
8.00	83			
		233	233	
9.00	383			233
		610	305	
9.50	836			538 (Vg)

Above Grade Storage NCDEQ = 538 cf

Equivalent Storage (On site runoff only) = 6.14 in

Equivalent Storage (On site + Off site runoff) = 1.55 in

B (REAR) - Above Grade Storage				
Elev	Area (sf)	Avg area (sf)	Volume (cf)	Cum Vol. (cf)
8.00	190			
		334	334	
9.00	478			334
		914	640	
9.70	1350			974 (Vg)

Above Grade Storage NCDEQ = 974 cf

Equivalent Storage = 2.74 in

## Front Infiltration Basin Drawdown Calculations

Hydraulic Conductivity = 5.95 in/hr

Max Stored Depth = 18 in

Drawdown Time = Stored Depth / Hydraulic Conductivity

Drawdown Time = 3.03 hrs or 0.13 days

## Rear Infiltration Basin Drawdown Calculations

Hydraulic Conductivity = 5.95 in/hr

Max Stored Depth = 20.4 in

Drawdown Time = Stored Depth / Hydraulic Conductivity

Drawdown Time = 3.43 hrs or 0.14 days